# STRUCTURE AND MAGNETIC PROPERTIES OF MAGNETRON SPUTTERED PERMALLOY FILMS PREPARED AT DIFFERENT DEPOSITION RATES AND FOR SELECTED BUFFER LAYERS

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Permalloy films are very important soft magnetic materials, widely used in technological applications like magnetic recording media and magnetic sensors [1]. On one hand, the magnetic properties of the FeNi films are determined by the peculiarities of their structure [2]. On the other hand, the conditions of deposition influence the formation of the film structure [3]. In addition, the structure of thin films obtained by the sputtering depends on the material of buffer layers [4]. In this work, we investigate the influences of both the FeNi deposition rate and Cr, Cu, Ta and Ti seed layers on the structure and magnetic properties of FeNi films prepared by dc magnetron sputtering in similar conditions.

Thin films were deposited by magnetron sputtering deposition onto glass Corning glass substrates at room temperature. The deposition rate for FeNi layers was controlled by variation of the distance between the target and the substrate at magnetron power of 100 W. The microstructure was studied by X-ray diffraction (Cu$K_\alpha$ radiation). The in-plane magnetic hysteresis loops were measured by the magnetooptical Kerr effect. The anisotropic magnetoresistance was measured by the conventional four-point technique.

It was established that the deposition rate does not notably affect structural and magnetic properties of the films under consideration. The presence of the the Cr buffer layer does the same. Cu buffer layer worsens all of the properties of permalloy films. The FeNi films deposited onto a Ta and Ti buffer layers had high crystallinity degree and high level of the crystallographic texture. In order to guarantee the fabrication of thin film permalloy-based devices with appropriate electromagnetic properties, the conditions of the film preparation and material of the buffer layer can be varying. Additional changes of the buffer layer thickness and substrate temperature can offer extra advantages for the purpose of varying the properties of the FeNi films for sensor applications.

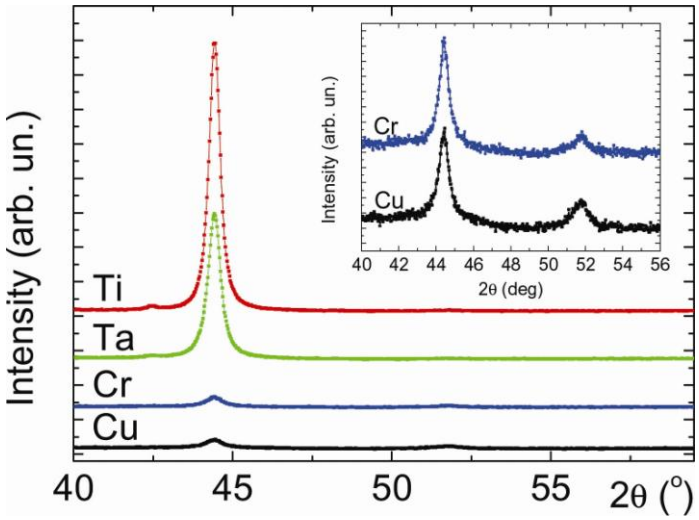


Fig. 1. X-ray diffraction curves for the FeNi films deposited onto different seed layers: Cu, Cr, Ta and Ti. Inset shows the part of the same graphs on a smaller scale.


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## ВЛИЯНИЕ ТЕМПЕРАТУРНОГО ГРАДИЕНТА НА ПЕРЕХОД ВОДЫ СО ЛЬДА В ГРУНТОПОДОБНУЮ СРЕДУ ПРИ ОТРИЦАТЕЛЬНЫХ ТЕМПЕРАТУРАХ


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## THE INFLUENCE OF TEMPERATURE GRADIENT ON THE TRANSITION OF WATER FROM THE ICE IN A DISPERSION MEDIUM AT TEMPERATURES BELOW ZERO


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The paper presents an analysis of the results of the Study of water dynamics of the transition from the surface of the ice in the dispersion medium, based on sand. The existence of two competing energy transfer processes in the studied sample